GPRS/EDGE Digital Cellular Modem

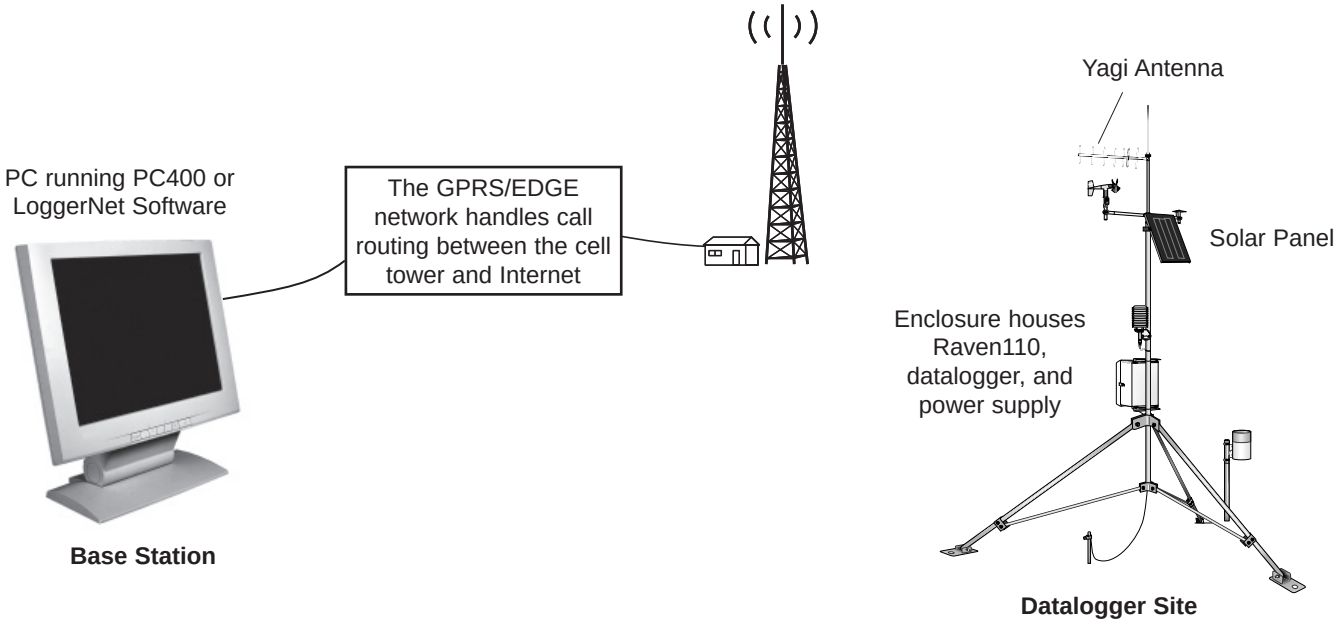
Model Raven110

The Raven110 is a an Airlink product intended for AT&T digital cellular networks. This full-duplex modem transmits data to the local cellular tower using either a GPRS[1] or EDGE[2] network. The data is sent from the tower to the base station computer via the Internet. Communicating via the Internet provides faster communication rates and eliminates dialing delays and long distance fees.

Features

- Supports GPRS and EDGE digital cellular networks
- Eliminates dialing delays
- Allows simultaneous communications with multiple dataloggers in the network
- Communicates at rates up to 384 kbps
- Housed in a rugged aluminum case
- Operates over a wide operating temperature range of -30º to +70ºC
- Eliminates long distance fees

Typical System


PC running PC400 or LoggerNet Software
The GPRS/EDGE network handles call routing between the cell tower and Internet
Base Station
Yagi Antenna
Solar Panel
Enclosure houses Raven110, datalogger, and power supply
Datalogger Site

[1]*General Packet Radio Service*

[2]*Enhanced Data rates for GSM Evolution*

Cellular Coverage/Service Requirements

- AT&T GPRS or EDGE network with coverage at the datalogger site (for a coverage map, refer to www.wireless.att.com/refresh/common/estore_zipcode_maps).
- Call AT&T at 1-800-331-0500 and ask for the following:
  - A "Data Plan" (three options are offered)
  - A static IP account. Although use of a dynamic IP account is possible, Campbell Scientific strongly suggests establishing a static account. To use a dynamic account, a service such as IP Manager is required to translate the dynamic IP address to a domain name so that the Raven110 can be contacted as if it had a static IP address.
  - Feature code "G821" to be added to the account. Feature Code G821 configures the account for the "Internet" Access Point Name (APN), and the device to "Mobile Terminated", which makes the modem accessible by LoggerNet over the Internet. Feature Code G821 may also be added after the account has been set up.
- AT&T can also setup a custom APN, which will take four to six weeks and cost about $1000.00. A custom APN may offer more efficient routing, and better security.
- AT&T will provide a SIMM card for each modem. In some cases the SIMM card can be picked up at a local AT&T store. The SIMM card must be installed inside of the modem (see Appendix B of the manual).

The #18663 null modem cable connects directly to the datalogger's RS-232 port. This cable is the only option available for connecting a Raven110 modem to a CR200-series datalogger.

The SC105 interface connects the modem to the datalogger's CS I/O port, and is recommended when using a PakBus® datalogger.

Datalogger Site Equipment

- Raven110 Modem—includes a power cable. The following software is used to program the modem:
  - Airlink's SetupWizard—activates the modem. It is provided on a CD that is shipped with the Raven110 and is also available, at no charge, from: www.airlink.com
  - Airlink's Wireless Ace Software—configures the generic parameters of the modem. It is provided on a CD that is shipped with the Raven110 and is also available, at no charge, from: www.airlink.com
  - Campbell Scientific's Raven GPRS/EDGE Template—used with the Wireless Ace software to configure the modem. This template sets up the Raven serial interface, which is specific to our systems. The Raven GPRS/EDGE Template is available, at no charge, from: www.campbellsci.com/downloads
- Campbell Scientific Datalogger—all of our contemporary and many of our retired dataloggers are compatible.
- Datalogger connection options:
  - The #18663 null modem cable—connects the modem to the datalogger's RS-232 port.
  - An SC105 or SC932A interface—connects the modem to the CS I/O port.

The SC932A interface connects the modem to the datalogger's CS I/O port, and is recommended when using a mixed-array datalogger.

- Mounting Kit—includes mounting hardware for securing the modem to an environmental enclosure.

- Antenna—Campbell Scientific offers the following antennas for use with our cellular modems. Contact an Applications Engineer for help in determining the best antenna for your application.

  - 14453—0 dBd, ½ Wave Dipole Whip Cellular Antenna. It supports the 800 MHz band and is intended for locations that have strong cellular coverage. The antenna attaches directly to the Raven110 modem and should reside in an environmental enclosure.

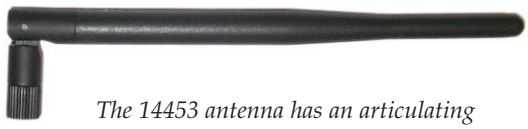
  - 18285—1 dBd, Omnidirectional Antenna. This antenna is dual band, covering both the 800 MHz and 1.9 GHz bands. The 18285 includes a 10 ft cable for attaching to the modem and a mounting bracket for attaching the antenna to a crossarm, tripod, tower, or pole.

  - 14454—9 dBd, Yagi Antenna. This antenna supports the 800 MHz band and is intended for sites near the edge of the the cellular coverage. The antenna must be aimed at the service providers's antenna. The 14454 includes 10 ft of cable for attaching the antenna to the modem and a bracket for attaching the antenna to a mast or post up to 1.5" (3.8 cm) in diameter. Often the CM230 Adjustable Inclination Mount is used with the 14454.

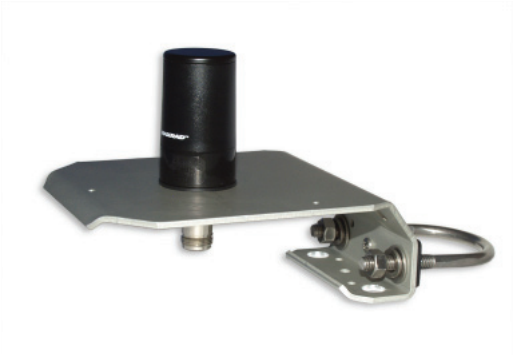
- CM230 Adjustable Inclination Mount—allows the 14454 Yagi antenna to be aimed at the service provider's antenna.

- Power Supply (see power considerations)

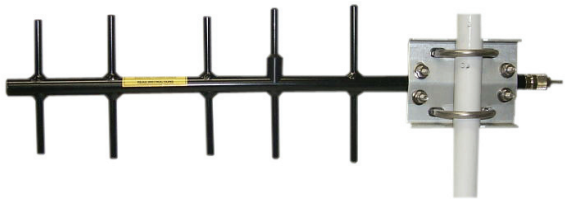
- Environmental Enclosure—typically an ENC12/14 or ENC16/18 is used to house the Raven110, datalogger, and power supply.



The 14453 antenna has an articulating knuckle joint that can be oriented vertically or at right angles.



The 18285 antenna is recommended for many of our applications. It is the only cellular antenna offered that supports the 1.9 Ghz band.



The 14454 Yagi antenna is intended for longer transmission distances.

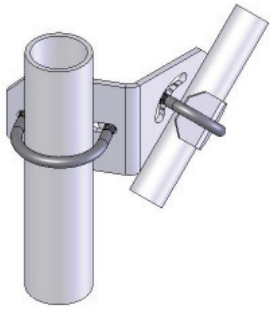
Base Station Requirements

- PC running PC400 or LoggerNet Datalogger Support Software.

- Access to the Internet.

Power Considerations

A power cable included with the modem connects to the datalogger's 12 V or switched 12 V terminal. Connection to the switched 12 V terminal allows the datalogger to switch power to the modem during scheduled transmission intervals, thereby conserving power. When using the switched 12 V terminal, the modem can be powered with a BP12 battery, CH100 charger/regulator, and SP10 solar panel. For help on analyzing your system's power requirements, refer to our Power Supply product literature or application note.



When using the CM230, fix the declination of the antenna by tightening the u-bolt that mounts on the mast. The inclination is then adjusted with the other set of u-bolts and nuts.

Specifications

Technology:	EDGE (MS class 10) with GPRS (MS-12) fallback
Band:	Quadband 1900/850 MHz and 1800/900 MHz
Transmit Frequency:	1850-1910 MHz and 824-849 MHz
Transmit Power:	1.0 W for 1900 MHz; 0.8 W for 850 MHz
Receiver Frequency:	1930-1990 MHz and 869-894 MHz
EDGE Throughput:	up to 384 kbps
GPRS Throughput:	up to 70 kbps
RS-232 Data Rates:	1200 bps to 115.2 kbps
Input Voltage:	10 to 28 Vdc
Input Current:	20 to 250 mA
Typical Current Drain at 12 Vdc:	20 mA dormant connection (idle for 10 to 20 seconds), 130 mA transmit/receive
Operating Temperature Range:	-30° to +70°C (10% duty cycle limit above 60°C)
Operating Humidity:	5% to 95% non-condensing
Serial Protocols:	AT Commands, PPP, SLIP, UDP, TCP
Serial Interface:	RS-232, DB9-F
RF Antenna Connector:	50 Ohm TNC
Status LEDs:	Power, Channel Acquired, Link Status, Network Registration, RSSI, Transmit/Receive, Block Errors
Dimensions:	3"W x 1"D x 5.1"L (5.8"L w/connector) 7.6 W x 2.5 D x 13 L cm (14.7 L cm w/connector)
Weight:	<1 lb (<0.5 kg)

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